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Tracking Environmental Mitigation Projects: A Survey of Methods Used by State DOTs

Prepared for
Division of Transportation System Development

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Request for Report

To minimize the effects of road construction and development, WisDOT works to reduce change to the natural environment and leads several efforts to restore project areas. The Division of Transportation System Development is interested in learning whether other states have asset management systems or processes in place for tracking their environmental mitigation projects. DTSD is particularly interested in learning how other states track internal staff costs to design and monitor the mitigation facilities (wetland enhancements, wildlife crossings, detention basins for storm water runoff, etc.), construction costs to build the mitigation facilities, and costs to maintain the facilities over time (staff and materials).

Summary

To locate pertinent practices, we mined the FHWA, TRB and TRIS Online databases, and searched state DOT Web sites. We found that many states have developed successful **Tracking Mechanisms** such as databases, forms and lists to ensure that departments communicate with each other and that commitments stay attached to projects throughout their life. Our research suggests that one of the most popular tools for tracking is the specialized database—agencies using this method include Colorado, Illinois, Montana, New York and Washington State DOTs and the Pennsylvania Turnpike Commission. Several states have developed mechanisms to track costs associated with environmental mitigation:

- Arizona DOT's Environmental and Enhancement Group has a limited but expanding capacity to track some environmental mitigation costs incurred by the agency during project delivery.
- In 2005, the Kentucky Transportation Cabinet introduced 22 new activity codes for use by environmental staff and a comparable set of 22 codes for tracking consultant activity that are expected to improve the agency's cost tracking capabilities.
- All Maryland SHA staff time and preconstruction consultant activities are tracked using the agency's Financial Management Information System.
- Montana DOT maintains a database to track the costs of its mitigation projects. Cost items include NEPA evaluation, engineering/design, right-of-way (property) acquisition, acres and cost per acre.
- Elements of Oregon DOT's cost tracking methodology include planning costs, preliminary engineering/environmental costs, right-of-way costs, design costs, construction costs and maintenance costs.

Tracking Mechanisms

California

Environmental Commitments Record

Memorandum from Richard Land, Caltrans Chief Engineer, to deputy district directors for Construction, Design, Environmental and Project Management, June 2005
http://www.dot.ca.gov/ser/downloads/memos/DDDs_const_design_env_proj_mgmt.pdf
From the memorandum:

> In support of the California Department of Transportation's goal of stewardship, it is important to effectively track and document the completion of environmental commitments throughout the project delivery process. To accomplish this, each district shall establish and maintain an Environmental Commitments Record (ECR) for each project. The purpose of the ECR is to ensure that the department meets its environmental commitments by: 1) recording each environmental mitigation, compensation and enhancement commitment made for an individual project; 2) specifying how each commitment will be met; and 3) documenting the completion of each commitment.
>
> The ECR brings all relevant environmental compliance information together in a single place, making it easier to track progress and easier for project team members to identify actions they need to take. The District 11 Mitigation Monitoring and Reporting Record and the District 4 Permits, Agreements and Mitigation form are two examples of approaches to the ECR. Districts may use one of these approaches, or develop one that better meets their needs.
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> - Mitigation Monitoring and Reporting Record
> http://www.dot.ca.gov/ser/downloads/general/sample_mmrr_ECL-memo.xls
> - Permits, Agreements and Mitigation form
> http://www.dot.ca.gov/ser/downloads/general/Sample_PAM.XLS

Montana

Mitigation of Ecological Impacts

NCHRP Synthesis 302, 2002
http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_syn_302.pdf
This synthesis summarizes available information on the types of ecological impacts incurred by highway projects and the methodologies used to assess these impacts, procedures for determining the need for mitigation and monitoring, types of mitigation implemented for different impacts and how mitigated sites are monitored, methodologies for the evaluation of mitigation success or failure, and the costs of mitigation.

From Chapter 5, Costs (pages 25-26 of the PDF):

> Several DOTs stated that they are considering or are in the process of developing a detailed database to monitor the status and costs of their mitigation projects. The databases may include name and location of project, type of project, acreage or linear feet, construction status, monitoring status, and costs. Costs may include the elements of design, right-of-way, construction, monitoring and maintenance. For managed mitigation banks, the databases will also serve to track available mitigation credits in the form of acres, linear feet and habitat conservation credits for special status species. The databases will reflect the needs of individual DOTs.
>
> Montana DOT has been maintaining a database to track the costs of its mitigation projects. Cost items include NEPA evaluation, engineering/design, right(s)-of-way (property) acquisition, acres and cost per acre. The property costs represent the highest cost item for mitigation projects.

New York

The NYSDOT Environmental Initiative – Guidelines and Procedures for a New Paradigm

New York State Department of Transportation Environmental Analysis Bureau
https://www.nysdot.gov/portal/page/portal/programs/envi-init/files/eitrbdot.pdf
This paper describes NYSDOT's Environmental Initiative and its procedures for "bringing the engineering capabilities of a state DOT to bear on the environmental stewardship responsibilities shared by all governmental organizations."

From Elements of the Environmental Initiative; Procedures; Evaluation and Reporting Measures (page 8 of the PDF):

> Environmental Initiative activities are tracked at both the project and program level statewide. Utilizing the department's automated Project and Program Management Information System (P/PMIS), program managers select Environmental Initiative attributes for any particular project as part of a general work type. This allows for the tracking and management of Environmental Initiative work related to the department's capital construction program and maintenance activities.

South Dakota

Linking Planning and NEPA: Progress Report FY 2005/Quarter 4

http://environment.fhwa.dot.gov/integ/workshop_fy05q4.asp

In 2005, the Volpe Center interviewed 17 of the FHWA division offices that participated in the *Linking Planning and NEPA: Towards Streamlined Decisionmaking* workshop to discuss the status of linking planning and National Environmental Policy Act efforts in their states. Findings from the interviews are provided in this quarterly report, which focuses on activities occurring between July 1 and Sept. 30, 2005.

Scroll to "South Dakota – Concept to Construction":

> Concept-to-Construction (C-to-C) is a new internal South Dakota DOT process that has been implemented to obtain consistency in the project scoping and cost estimating process. Prior to the workshop, SDDOT began developing the process. C-to-C is designed to communicate and track environmental commitments made during project development. Documenting and sharing the results and decisions within SDDOT is also part of the C-to-C process. A C-to-C Module consisting of a database of project information is currently being developed.

Multiple DOTs

Domestic Scan: Environmental Commitment Implementation – Innovative and Successful Approaches

Prepared for the Office of Project Development and Environmental Review, FHWA

http://www.environment.fhwa.dot.gov/strmlng/domScanRpt/index.asp

In 2002, FHWA sponsored a tour of seven state DOTs to review successful state processes, procedures and methodologies used in fulfilling environmental commitments made in the transportation project development process and environmental permits. This report discusses the approaches gathered by the team, which present a variety of possibilities for improving systems and processes to ensure commitment compliance.

From Chapter 3, Best Management Practices; Section 6, Tracking Mechanisms:

http://www.environment.fhwa.dot.gov/strmlng/domScanRpt/chapter3.asp

> Many states have developed successful tracking mechanisms such as databases, forms and lists to ensure that departments communicate with each other and that commitments stay attached to a project throughout its life.
>
> - Colorado DOT Region 6 has created a Mitigation Compliance Tracking System that catalogues project details, including compliance clearance status and mitigation. The database lists projects individually and includes information on a project's type of documentation, permits and clearances.
> - Texas DOT's central office has introduced an Environmental Tracking System to be used by all of its districts. ETS allows the districts to track project documentation, comments, surveys, public involvement, interagency coordination and issues regarding Section 4(f) of the 1966 U.S. DOT Act. ETS automatically generates a spreadsheet that calculates the estimated timeframe for environmental clearance and ROW acquisition.
> - New York State DOT's ETRACK database is a Microsoft application linked to the department's Program Support System, which tracks projects and their major milestones, and details specific aspects of a project such as environmental, landscape and architecture, and social impacts.

Final Report for NCHRP Research Results Digest 317: Prototype Software for an Environmental Information Management and Decision Support System

NCHRP Web-Only Document 103, November 2006

http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_w103.pdf

From the Summary (pages 11-12 of the PDF):

> The NCHRP 25-23 research initiative was designed to develop and provide tools to assist transportation and planning agencies in meeting the environmental challenges of today and those to come. This report details the work performed for Phase 2 of the 25-23 initiative. The objective of the project was to design, test and

demonstrate a prototype software program for an environmental information management system (EIMS). The EIMS is an information management system with a Web-based user interface, relational database and map interface, and it supports functionality that includes commitment tracking- definition of commitments and specific actions taken related to a commitment; as well as association of commitments with a specific plan, project or asset. Appendix B of the report (page 65) provides the EIMS User's Guide; the prototype software can be downloaded from http://www.trb.org/news/blurb_detail.asp?ID=7310

The research team reviewed several systems that have been developed to support environmental management in greater detail to inform the design of the EIMS. Section 2 (page 15) and Appendix A (page 53) provide additional detail on the findings of the review, and include:

- **Illinois** (page 55). Developed the Project Monitoring Application database to track the status of biological and cultural resource surveys, including ability to run annual reports and track internal compliance.
- **Indiana** (pages 55-56). Developed a mitigation commitment summary from an electronic project tracking system which INDOT incorporates into NEPA document and project plans. Incorporating the summary into the tracking system has increased the effectiveness of the summary and resulted in more complete implementation of environmental commitments.
- **Kentucky** (page 56). Developed an online commitment tracking approach called "Communicating All Promises" that posts and tracks all agency commitments through all phases of project development and implementation.
- **Maryland** (pages 56-57). Developed an information management system to inventory, rank and track hydraulic and water quality control structures. Developed a desktop permit tracking system, to which it is adding commitment tracking capabilities, focused on project development and design. Used a commitment tracking system for large and environmentally controversial projects.
- **New York** (pages 58-59). Established the Environmental Commitment and Obligations Package for Construction (ECOPAC) that records and tracks environmental compliance of construction projects.
- **Oregon** (pages 59-60). Initiated efforts to estimate and track environmental costs; in the process of adding elements to accounting system for expanded tracking.
- **Pennsylvania** (pages 60-61). Developed a Cultural Resource Document Tracking system, enabling automated environmental reviews, support to design processes, and expedited alternatives analysis. PennDOT plans to integrate this system with GIS in the future.
- **Pennsylvania Turnpike Commission** (page 61). Developed computerized spreadsheet/database tracking systems. Systems identify and monitor right-of-way requirements (not in NEPA document), changes in environmental impacts, and fulfillment of mitigation commitments during construction.
- **Washington** (page 63). Developed a commitment tracking system that tracks all formal commitments (environmental, design, right-of-way) from inception through construction to completion or handoff to Maintenance and Operations offices. WSDOT's database for tracking construction site erosion and sedimentation control risk, requirements/commitments and performance assesses trends and provides reports at the project, regional and state levels.

Costs Related to Compliance with Federal Environmental Laws: Case Studies in the Federal-Aid Highway Program: Final Report
TransTech Management Inc., for the FHWA Office of Planning, Environment and Realty, July 2006
https://nepa.fhwa.dot.gov/ReNEPA/ReNepa.nsf/All+Documents/AD3B902A775A2FCB85257219000DF2F1/$FILE/FINALAppA.TransTechReport10.23.06.doc
This study aimed to establish a comprehensive definition of state DOTs' environmental costs, including mitigation and documentation costs, and to use it to gather best available data on complete environmental costs for a set of case studies that represent the kinds of projects routinely undertaken by state DOTs.

From Chapter 3, Tracking Environmental Costs (page 14):

> To learn more about the state-of-the-practice among state DOTs in tracking environmental costs, practitioners at eight DOTs were interviewed including Arizona, Florida, Kentucky, Maryland, Oregon, Utah, Washington and Wisconsin. The interviews are intended to provide insight on a range of experiences among state DOTs in tracking environmental costs. Summaries of the interviews are included in Appendix A. Chapter 3 examines the benefits and barriers of tracking environmental costs (section 3.1), explains when DOTs incur environmental costs (section 3.2), demonstrates how agencies can use a combination of data from their

financial management information systems and detailed review of contracting documents to measure environmental costs with reasonable accuracy (section 3.3), and provides some general observations on tracking environmental costs (section 3.4).

From Executive Summary; Tracking Environmental Costs (page iii):

What are the benefits of tracking environmental costs? Most state DOTs do not track environmental costs, but those that do—including Montana, Oregon and Washington—report that cost tracking efforts help them provide greater accountability to stakeholders, support better policy-level decision-making, and improve project cost estimating and decision-making.

How can DOTs track environmental costs? Two categories of data are likely to provide the primary sources of information on environmental costs in most DOTs:

- Financial information management system data. State DOTs all maintain agency-wide electronic systems for managing financial information that are a potentially valuable resource for tracking environmental costs. Many DOTs, however, rely on antiquated mainframe-based computer programs to run their financial systems that are poorly set up to disaggregate environmental costs.
- Contractor and consultant contract records. Considerable amounts of information can be gathered from consultant and contractor contracting records, but this usually requires careful project-by-project scrutiny of documentation.

As a rule of thumb, a person knowledgeable about the project must carefully review costs reported in both types of information to ensure complete and accurate data is collected.

What are the challenges to tracking environmental costs? Many of the state DOTs interviewed for this project caution that environmental costs are hard to measure in practice. Some of the difficulties that must be overcome include financial management system limitations, apportioning project costs that have both environmental and nonenvironmental objectives, tracking in-house costs, separating costs of mandates from good stewardship, and estimating the costs of "the path not taken."

From Appendix A:

- **Arizona** (page A-2). Arizona DOT's Environmental and Enhancement Group has a limited but expanding capacity to track some environmental mitigation costs incurred by the agency during project delivery. When fully implemented, ADOT staff will have the ability to examine actual environmental mitigation costs by resource type (for example, endangered species, wetlands) for individual projects as they are incurred, and they will have a detailed database of historic environmental mitigation costs. The system also will have broader project management benefits, such as improved project-by-project tracking of consultant activities.
- **Kentucky** (page A-6). In 2005, KTC introduced 22 new activity codes for use by environmental staff and a comparable set of 22 codes for tracking consultant activity that are expected to improve the agency's cost tracking capabilities.
- **Maryland** (page A-8). All SHA staff time and preconstruction consultant activities are tracked using the agency's Financial Management Information System.
- **Oregon** (page A-10). Oregon DOT has developed detailed methodologies for measuring costs on a program level. Specific elements of ODOT's cost tracking methodology include planning costs, preliminary engineering/environmental costs, right-of-way costs, design costs, construction costs and maintenance costs.
- **Utah** (page A-12). At present, UDOT does not have a comprehensive environmental cost tracking system in place. The department is developing an electronic project management (ePM) system using an Oracle database platform. The system is almost complete and will enable much better tracking of environmental costs. The ePM will include about 25 environmental-related activity codes that will allow better tracking of staff time and consultant costs. The ePM also will allow project managers to predict environmental costs based on standard defaults for different types of activities.
- **Washington** (pages A-14 to A-15). For each project, the cost components included in WSDOT estimates include: environmental component of construction cost (taken either from contractor's bid document or engineer's estimate); share of total right-of-way acquisition cost (based on discussion with project team); allocated share of contractor's mobilization (based on discussion with project team, usually assumed to be 10% of overall construction amount); allocated share of WSDOT's cost for construction engineering and administration (based on discussion with project team); allocated share of WSDOT cost for planning, NEPA

and design (based on discussion with project team, usually assumed to be 5 to 15% of overall project costs). Data for each of these elements is tracked in WSDOT's electronic Program Delivery System, which provides a comprehensive accounting system for the department.

Additional Resource

FHWA White Paper: Environment and Asset Management

http://www.fhwa.dot.gov/infrastructure/asstmgmt/amppenv.htm

The purpose of this paper is to define the relationship between transportation asset management and transportation system planning and to describe the current, and potential future, activities of FHWA's two environment offices that support the implementation of asset management.

From Section 2.3, Application of Asset Management Principles to Environmental Activities; Performance-Based:

> Specific performance measures need to be identified for each policy goal and objective in order to define how progress in meeting these objectives is going to be determined and monitored over time. Setting appropriate performance measures for environment is a complicated matter for transportation agencies, because the ultimate environmental outcomes in a location or region are generally the result of a myriad of factors, only some of which are under the agency's control. Nonetheless, agencies have developed a wide range of performance measures to track their progress in meeting their environmental goals and objectives at each phase of the transportation process. These include efficiency measures for managing environmental processes, output measures to target and track levels of program activity, and outcome measures that gauge progress in environmental improvements. ...Performance measures are also used to track and assess process efficiencies, such as the time taken to complete environmental impact statements or conduct reviews. The definition of clear measures enables agencies to analyze options and tradeoffs in terms of total costs, environmental benefits, transportation benefits, and process efficiencies.